ICRC2015

ICRC
The Astroparticle Physics Conference
34th International Cosmic Ray Conference
July 30 - August 6, 2015
The Hague, The Netherlands

Contribution ID: **610** Type: **Poster contribution**

Modern Middleware for the Data Acquisition of the Cherenkov Telescope Array

Saturday, 1 August 2015 15:30 (1 hour)

The Data Acquisition system (DAQ) of the future Cherenkov Telescope Array (CTA) must be efficient, modular and robust to be able to cope with the very large data rate of up to 100 GByte/s coming from many telescope with different characteristics. The use of modern middleware, namely zeroMQ and protocol buffers, helped to achieve these goals while keeping the development effort to a reasonable level. The protocol buffers are used as an on-line data format, while zeroMQ is employed to communicate between processes. The DAQ framework itself will be placed under the supervision of the Alma Common Software (ACS) based control software.

The protocol buffers from Google are a way to define high-level data structures through an IDL-like specific language and a meta-compiler. zeroMQ is a middleware that augments the capabilities of TCP/IP sockets. It does not implement very high-level features like e.g. CORBA, but only makes the use of sockets easier, more robust and almost as effective as raw TCP ones. The use of these two middlewares enabled us to rapidly develop a robust prototype of the DAQ system including data persistence to compressed FITS files.

Collaboration

CTA

Registration number following "ICRC2015-I/"

362

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Session Classification: Poster 2 GA

Track Classification: GA-IN